

Greatest Common Factor Using Factor Trees

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CONCEPT

1

Greatest Common Factor Using Factor Trees

Here you'll learn how to find the greatest common factors of number by using factor trees.

Remember Maria from the last Concept? Well, in that Concept, she figured out the basketball teams by using lists. What if she had done it a different way? Could the same result be expected? Let's look at the problem again, but this time we will solve it another way.



The sixth grade teachers have decided to have a big basketball tournament as part of the sixth grade social. The sixth graders in clusters 6A and 6B love basketball, and when the agenda is announced, all of the students are very excited. The biggest question is how many teams to divide the students from each cluster into. The teachers want to have the same number of teams, otherwise it will be difficult to have even games for a tournament.

Cluster 6A has 48 students in it.

Cluster 6B has 44 students in it.

The teachers pose the dilemma to the students and Maria volunteers to figure out the teams. She needs to figure out how many teams to divide each cluster into and how many students will then be on each team. Maria has an idea how to do it. She knows that factors are going to be important. She just isn't sure how to make certain that each cluster is divided into the same number of teams.

Use this Concept to help Maria solve this problem in a new way.

Guidance

You just learned how to find the GCF by making lists. We can also find the GCF by making a factor tree.

Find the GCF of 20 and 30.

First, we make a factor tree for each number.

$$\begin{array}{c}
 20 \\
 / \quad \backslash \\
 4 \quad 5 \\
 / \quad \backslash \\
 2 \quad 2 \\
 2^2 \times 5
 \end{array}$$

$$\begin{array}{c}
 30 \\
 / \quad \backslash \\
 5 \quad 6 \\
 \quad / \quad \backslash \\
 \quad 3 \quad 2 \\
 5 \times 3 \times 2
 \end{array}$$

Here is a tricky one because there is more than one common prime factor. We have both five and two as common factors. **When you have more than one common factor, we multiply the common factors to find the GCF.**

$$2 \times 5 = 10$$

10 is the greatest common factor (GCF).

Now it is your turn. Use factor trees to find the GCF of each pair of numbers.

Example A

14 and 28

Solution: 7

Example B

12 and 24

Solution: 12

Example C

16 and 18

Solution: There isn't a greatest common factor for 16 and 18.

Now let's go back to Maria and the basketball game. Here is the original problem once again.



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The first thing that we are going to do is to build two factor trees so that we can identify the greatest common factor. The two classes have 48 and 44 students in them. So we can create a factor tree for 44 and one for 48.

$$\begin{array}{c} 48 \\ / \quad \backslash \\ 4 \quad 12 \end{array}$$

$$\begin{array}{c} 44 \\ / \quad \backslash \\ 11 \quad 4 \end{array}$$

The greatest common factor of 48 and 44 is 4.

The students should be divided into 4 teams.

Vocabulary

Here are the vocabulary words used in this Concept.

Factor a number multiplied by another number to get a product.

Greatest Common Factor the greatest factor that two or more numbers has in common.

Product the answer of a multiplication problem

Guided Practice

Here is one for you to try on your own.

Find the GCF of 36 and 54 using factor trees.

$$\begin{array}{c} 36 \\ / \quad \backslash \\ 4 \quad 9 \end{array}$$

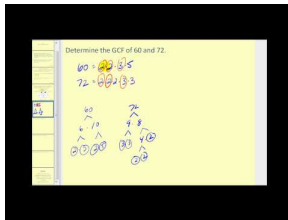
$$\begin{array}{c} 54 \\ / \quad \backslash \\ 9 \quad 6 \end{array}$$

We could keep on going and factor these values to their primes; however, the greatest common factor has already revealed itself in the first stage of the factor tree.

The greatest common factor of 36 and 54 is 9.

Video Review

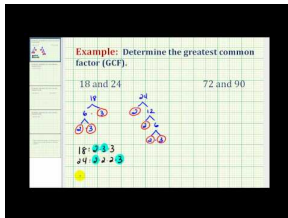
Here are videos for review.



MEDIA

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James Sousa GreatestCommon Factor



MEDIA

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James Sousa Example of Determining the Greatest Common Factor

Practice

Directions:Name the greatest common factor for each pair of numbers. If there isn't a gcf for the pair, then write none.

1. 14 and 28
2. 14 and 30
3. 16 and 36
4. 24 and 60
5. 72 and 108

6. 18 and 81
7. 80 and 200
8. 99 and 33
9. 27 and 117
10. 63 and 126
11. 89 and 178
12. 90 and 300
13. 56 and 104
14. 63 and 105
15. 72 and 128